

# IGCSE Mock Chemistry year 11 2011

## Mark scheme Paper 2

1.

Question	Mark	Acceptable answers	Notes	Total
6 a	M1	$C_nH_{2n}$	Accept $H_{2n}C_n$ Accept other letters such as x	1

Question	Mark	Acceptable answers	Notes	Total
6 b	M1	$  \begin{array}{cc}  H & H \\  \backslash & / \\  C & = & C \\  / & \backslash \\  H & H  \end{array}  $	Ignore bond angles Ignore names and molecular formulae	1

Question	Mark	Acceptable answers	Notes	Total
6 c	M1	yellow / orange	Ignore brown Reject red and any other colours	1
	M2	colourless / decolorised	Ignore clear	1

6 d i	M1	water / steam / $H_2O$		1
	M2	phosphoric acid	re dilute / concentrated	1
	M3	high temperature / 200 - 400 °C / high pressure / 60 - 70 atm	Do not apply list principle	1

Question	Mark	Acceptable answers	Notes	Total
6 d ii	M1	oxidation / reduction / redox		1

Question	Mark	Acceptable answers	Notes	Total
6 d iii	M1	$CH_3COOCH_2CH_3$ / $CH_3COOC_2H_5$ / more detailed formula	Ignore $H_2O$ Accept $CH_3CO_2CH_2CH_3$	1
	M2	ester		1

2.

Question	Mark	Acceptable answers	Notes	Total
8	a	M1	exothermic	1

Question	Mark	Acceptable answers	Notes	Total	
a	b	M1	shared electron(s) (between atoms)	Reject between molecules	1
		M2	two/pair (of electrons) / attracted to nuclei (of atoms)	dependent on M1	1

Question	Mark	Acceptable answers	Notes	Total	
8	c	M1	weak forces between molecules / intermolecular forces	Accept correctly intermolecular forces (ie Waals' forces / temporary dipole-dipole attractions / forces / dispersion forces Reject bonds between atoms / bonds breaking	1
		M2	little energy needed to overcome	M2 dependent on M1	1
				If neither M1 nor M2 scored, allow 1 mark for boiling point lower than room temperature/lower than 30 °C	

Question	Mark	Acceptable answers	Notes	Total	
8	d	M1	dot-and-cross pair between O and both H atoms	Allow any combinations of dots and crosses	1
		M2	four other electrons around O AND no more electrons around H	Ignore inner shell of oxygen Element symbols not needed, but if wrong then no marks -bonding electrons do not pair M2 dependent on M1	1

Question	Mark	Acceptable answers	Notes	Total
8	e	M1 (bonds broken) 1368 / (2 × 436)		1

				+ 496		
			M2	(bonds formed) 1852 / 4 × 463		1
			M3	-484 (kJ/mol or kJ)	Correct final answer scores 3 marks 484 or +484 scores 2 marks Ignore units M3 CQ on (M1 – M2)	1

Question	Mark	Acceptable answers	Notes	Total
8	f	M1	reactants/(2)H <sub>2</sub> + O <sub>2</sub> shown above 2H <sub>2</sub> O	1
			<del>e-symbols not needed</del> Ignore curves, vertical lines, ΔH data	

Question	Mark	Acceptable answers	Notes	Total
8	g	M1	decreases / slower	1
		M2	decreases / closer	1
			apt more tightly packed	

Question	Mark	Acceptable answers	Notes	Total
8	h	M1	CuSO <sub>4</sub> AND CuSO <sub>4</sub> .5H <sub>2</sub> O both correct	1
		M2	H <sub>2</sub> O AND consequently correct balancing	1
		M3	Accept ⇌ in place of → All state symbols correct, dependent on correct formulae (including CuSO <sub>4</sub> .2H <sub>2</sub> O etc)	1

3.

Question		Mark	Acceptable answers	Notes	Total
10	a	M1	filter / centrifuge and decant	Accept allow (precipitate) to settle and pour off water	1
		M2	wash / rinse		1
		M3	warm / heat / leave to dry/to evaporate/in warm place	Accept mention of drying with filter paper / Bunsen burner / hairdryer / oven	1
				M2 and M3 dependent on attempt at M1	

Question				Mark	Acceptable answers	Notes	Total
10	b	i	M1	5.55 ÷ 111			1
			M2	0.05		re units Correct answer scores both marks	1

Question			Mark	Acceptable answers	Notes	Total
10	b	ii	M1	0.05 / answer to (b)(i)	re units	1

Question		Mark	Acceptable answers	Notes	Total
10	b iii	M1	136	re-units	1

Question				Mark	Acceptable answers	Notes	Total
10	b	iv	M1	0.05 × 136 / answer to (b)(ii) × answer to b(iii)			1
			M2	6.8		Correct answer CQ on (b)(i) and b(ii) scores both marks If (b)(ii) incorrect, accept 6.8 if evidence of using mass ratios Ignore units	1

Question			Mark	Acceptable answers	Notes	Total
10	c	i	M1	$0.04(00) \div 0.5$		1
			M2	$0.08 \text{ dm}^3$	M2 dep on correct method for M1 (eg $0.4 \div 0.5 = 0.8 \text{ dm}^3$ scores M2 but not M1) Answer of $0.08 \text{ dm}^3$ scores M1 and M2	1
			M3	$80 \text{ (cm}^3\text{)}$	Unit not needed M3 CQ on M2 Correct final answer scores 3 marks	1

Question			Mark	Acceptable answers	Notes	Total
10	c	ii	M1	$(0.02 \times 24000 =) 480 \text{ (cm}^3\text{)}$		1

4.

Question	Mark	Acceptable answers	Notes	Total		
12	a	M1	lattice/regular arrangement/array of positive ions	If positive AND negative ions do not award M1	1	
		M2	sea of/delocalised/mobile electrons	Accept free electrons	1	
		M3	electrons move	If ions move then do not award M3	1	
	b	i	M1	steel/iron reacts with chlorine /forms iron chloride /oxidises	Ignore references to corrodes /wears away	1
		ii	M1	titanium / Ti		1
	c	i	M1	$100\,000 \times 2 \times 60$		1
		M2	12 000 000	Correct answer alone scores 2 Award 1 mark for answer of 200 000 Ignore units	1	
		ii	M1	$12\,000\,000 = 125$ 96 000		1
		M2	$\frac{125}{2} = 62.5 / 63$	CONSEQ on answer from ci correct answer scores 2 If fail to convert coulombs to Faradays, can score M2 only (6 000 000)	1	

5.

Question	Mark	Acceptable answers	Notes	Total
4	a	i	M1 y-axis labelled (mass or g) and mass scale correct (4 cm rep 0.1 g) units not required	2
		M2 x-axis labelled (volume or cm <sup>3</sup> ) and volume scale correct (1 cm rep 1 cm <sup>3</sup> ) units not required	units on axis do not replace mass / volume labels  scales on each axis must consist of two or more numbers (one of which can be zero).	

Question	Mark	Acceptable answers	Notes	Total
4	a	ii	M1 A correct volume reading from either part of line (2.5 or 8.5/8.6)	1
		M2 Correct units (cm <sup>3</sup> )	units not required, but penalise wrong units once in M1 and M2  Independent of M1	1
		M3 some CORRECT indication on graph for any one reading	correct construction with wrong value read off still scores M3	1

Question	Mark	Acceptable answers	Notes	Total
4	a	iii	M1 more readings between 4 and 6 cm <sup>3</sup> / around 5 / repeat between 4 and 6 / around 5 smaller intervals between specified volumes as above accept list of suitable values. Accept answers based on more values around suitable mass of precipitate	1

Question	Mark	Acceptable answers	Notes	Total
4	b	M1 weigh filter paper	can be implied (such as 'use a filter paper of known mass' or after M4 'subtract the mass of the filter paper')	1
		M2 filter		1
		M3 wash and dry	ignore how it is dried – an attempt at drying after washing is what is required	1
		M4 reweigh filter paper (with ppt)	M4 can only be awarded if the precipitate has been obtained by filtering	1

			M1	filter / centrifuge and decant		
			M2	wash and dry	ignore how it is dried – an attempt at drying after washing is what is required	
			M3	remove from filter paper / remove from centrifugation tube	this cannot be implied – it must be clear the precipitate is removed from the paper	
			M4	weigh (ppt)	M4 can only be awarded if the precipitate has been obtained, by filtering or centrifuging and decanting	

Question	Mark	Acceptable answers	Notes	Total	
4	c	i	M1	zinc has the same results / metal could be zinc	1

Question	Mark	Acceptable answers	Notes	Total
4	c	ii	M1 add ammonia (solution) to excess / M2 White / precipitate (does not dissolve/remains) M2 dependent on M1	1 1